

# TRANSIT CONNECTIVITY TO JOBS ANALYSIS

Metro Atlanta, Chatham county and Cherokee County

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This project focuses on providing a repeatable methodology to analyze transit connectivity opportunities to jobs across various counties/cities in Georgia with public transit systems or planning to build transit system. Transit accessibility increases jobs approachable area for employees who cannot afford a car and decreases air pollution by encouraging the utilization of public transportation. During the past few decades, accelerating urban expansion has imposed detrimental impacts on low-income families because less transportation methods limit their activity area. Moreover, urbanization has potentially created a discriminatory labor market with most jobs located in suburban areas. To eliminate the unbalance between where people live and where people work, a well-planned and fully-served transit system need to be offered to the public. This study thus formulates a GIS model to portray demographic and employment characteristics within transit service areas, and with the availability of Origin-Destination Employment Statistics provided by US Census Longitudinal Employer-Household Dynamics (LEHD) to analyze current public transit system in study area. Job opportunities are located by LEHD, and reachable job opportunities that can be accessed through public transit in study areas will be located by using General Transit Feed Specification (GTFS) and local transit GIS data. The two location results will be aggregated into one map to present how well the transit system is. Finally, the implication of research result for future transit expansion development in Georgia will be discussed, deliverable maps for transit job connectivity will also available to present.

## Background

Brookings research mentioned that public transit is a critical part of the economic and social part of metropolitan areas. Nearly 30 million trips are made every day using public transit. The nation's 100 metro areas occupied over 95 percent of all transit passenger miles traveled. There are 6.5 million trips made by workers (7% overall) in 100 largest metropolitan areas. The percentage is higher in low-income, which is 11 percent. "A high quality public transit network can allow employers to benefit from the clustering and agglomeration of people and businesses, and thereby raise productivity in metro areas."

## Data Source

- 1. Geography**  
All calculations and results in this project are based on geographies defined by the US Census Bureau, and accessibility calculations and results are on census block level. Topologically Integrated Geographic Encoding and Referencing (TIGER) provided by the US Census Bureau provides street information for study area. The data used in this project is generated from 2014.
- 2. Employment and Worker Population**  
Instead of estimating a certain percentage of population is workforce, US Census Bureau's Longitudinal Employer-Household Dynamics program (LEHD) provides a more accurate dataset. The dataset is updated annually and provides census block-level estimation. The data drawn from LEHD describing the distribution of labor's and employment's home and work locations in the study area. This project uses LODS data from 2011 which is the most recent accessible dataset as the project developing.
- 3. Pedestrian Network**  
Data describing the street in each census blocks were obtained from Topologically Integrated Geographic Encoding and Referencing (TIGER) program provided by the US Census Bureau. Streets pulled from TIGER will be used as the pedestrian network from home to transit stops.
- 4. Transit Schedule**  
The General Transit Feed Specification (GTFS) was developed by Google, Inc and Portland TriMet to provide format transit schedule for traveler routing and information tools. GTFS has detailed digital transit schedules in a consistent format which could be visualized in ArcGIS. All the GTFS data used in this project is latest version as the projection done.

## GIS Tools

ESRI developed a new tool to allow users easily add GTFS data into ArcGIS by using Add GTFS to a Network Dataset toolbox. GTFS data was originally stored as eight text files including stops and schedules separately which could not be applied in network analyses. This new tool could transform the data into stops (points) with schedule and combine the schedule information with the stops created in ArcGIS. After using this tool to set up the network dataset, Network Analyst could be perform transit/pedestrian accessibility analyses.

## Analysis Assumption

- ◆ Each census block has a centroid where all workers living in this census block will start their trip from.
- ◆ 15 second dwell time is assumed for each stop
- ◆ All the calculation is the result presenting that how many jobs could be reached by workers in 60 minutes
- ◆ 15 meters per second is assumed as an average walking speed for all workers in research area
- ◆ There is unlimited transfer for each trip calculated in this project
- ◆ All the trips start at 8 am.
- ◆ 1 mile buffer is applied to each route, which represents the area that employees have reasonably walking distance to transit stops.
- ◆ Final result is the average of multiple results of several Mondays dataset

## Conclusion

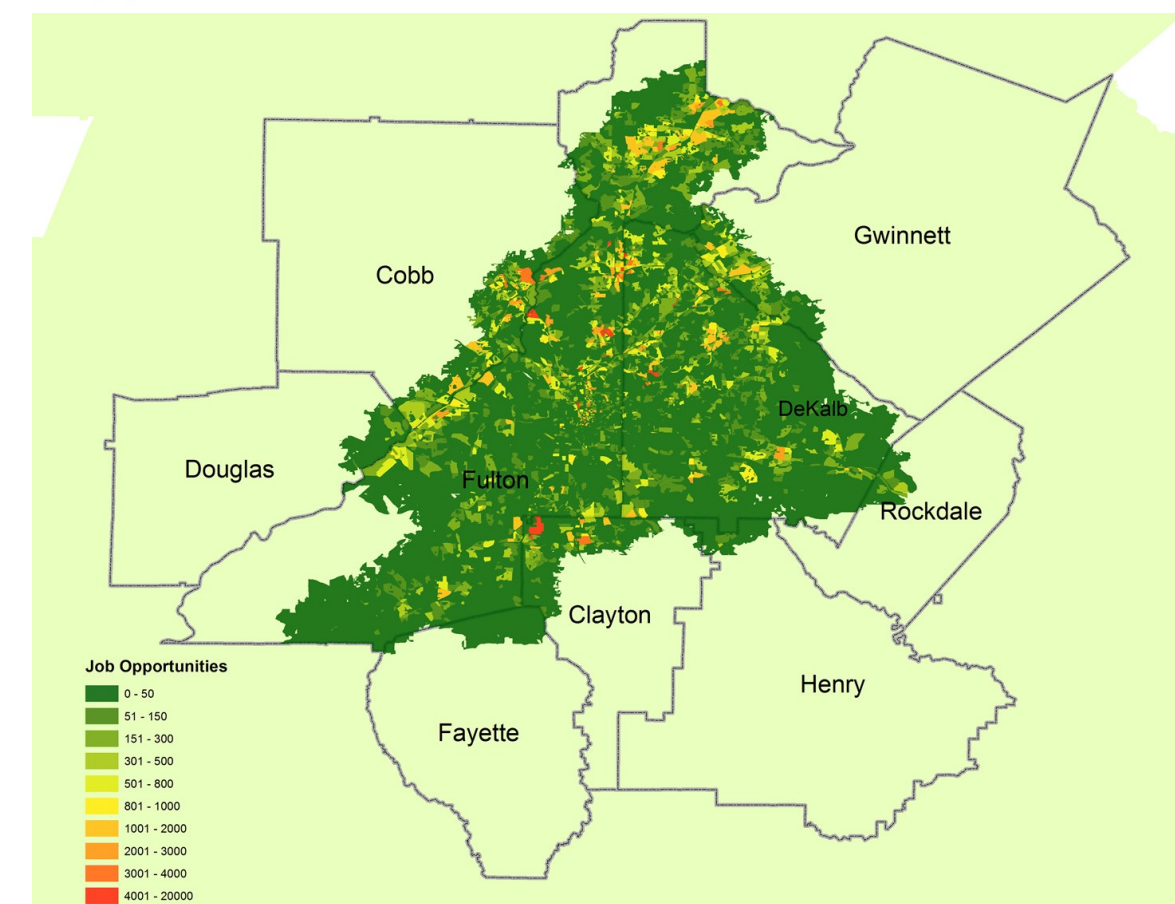
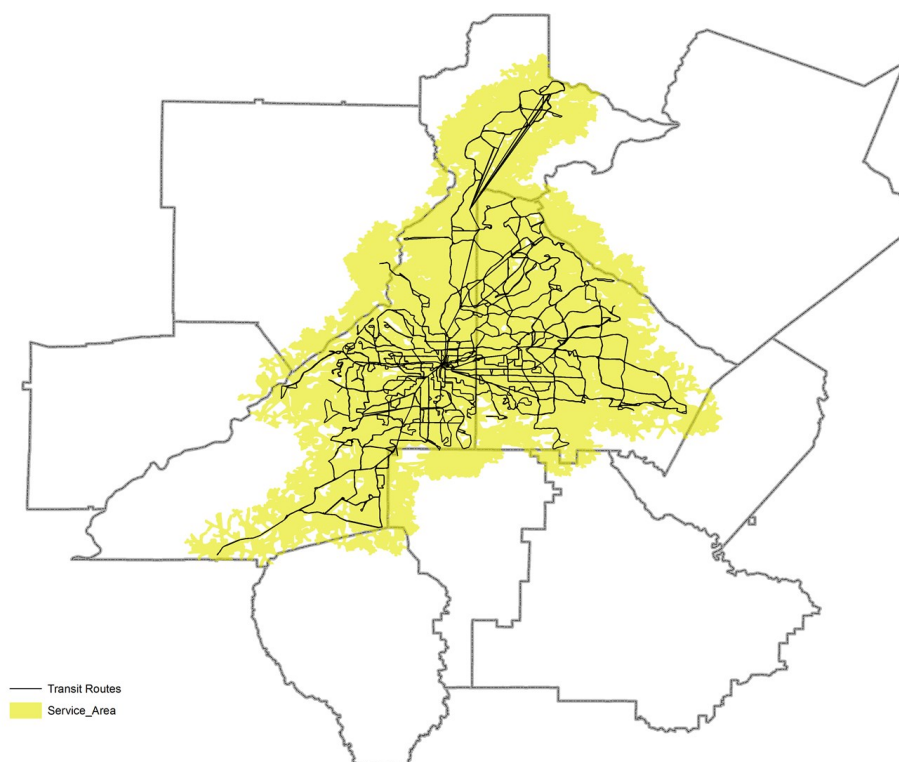
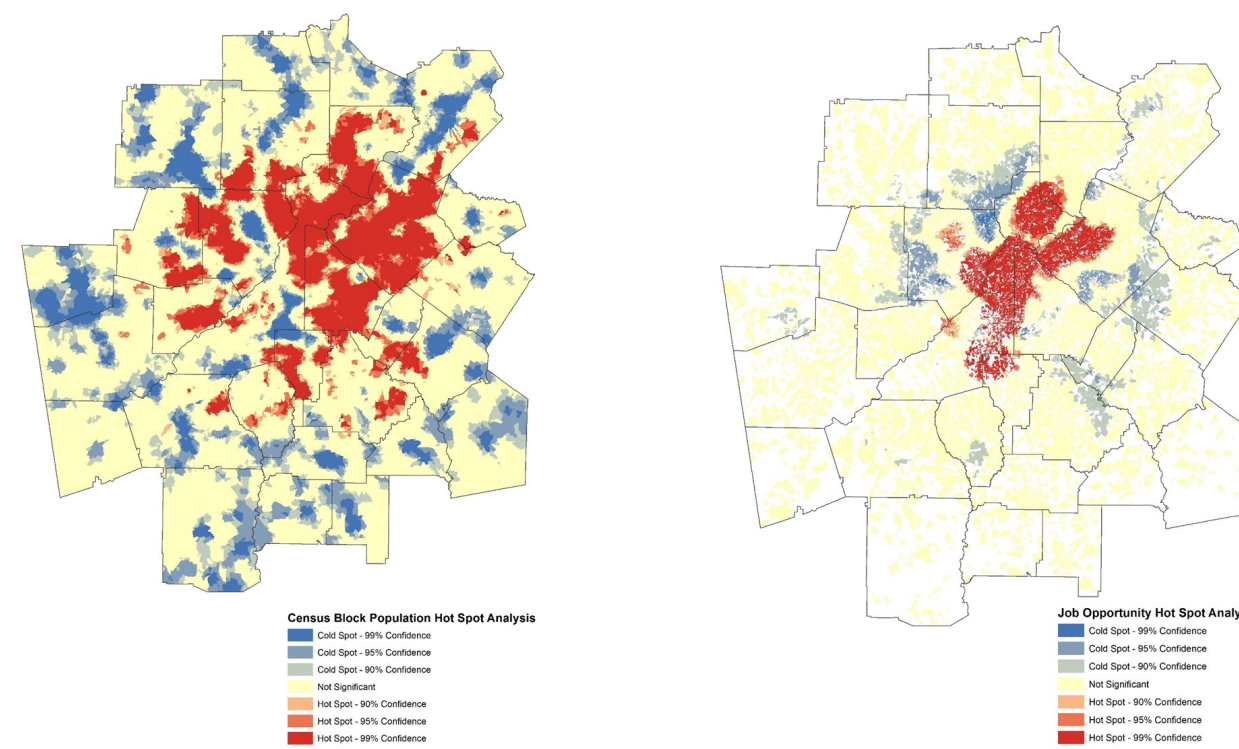
- Generally, the most populated areas are not the ones that have most job opportunities.
- Job accessibility for each block is largely associated with the density of transit surrounding it.

## Results

### Metro Atlanta

Metropolitan Atlanta Rapid Transit Authority (MARTA)

In Atlanta Metropolitan Area, a significant amount of population clusters can be found in Northern Fulton, DeKalb, Gwinnett, Western Cobb and Western Clayton. The distribution of employments in Atlanta is highly concentrated, more specifically, most job opportunities can be found in Northern Fulton, Southern Gwinnett and Western DeKalb, and in contrast to the population distributions, few job opportunities are available in West of the Cobb and East of DeKalb.



Average Service Area around each census block centroid  
**4.10** square miles.

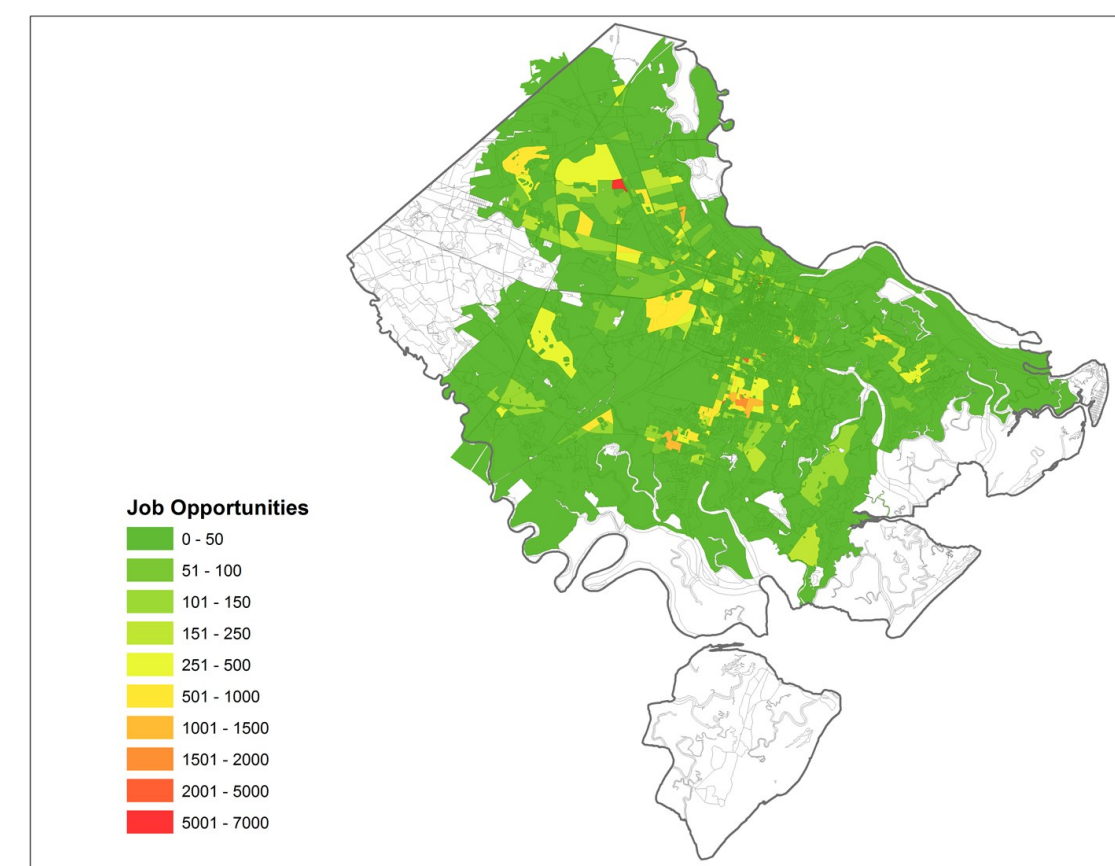
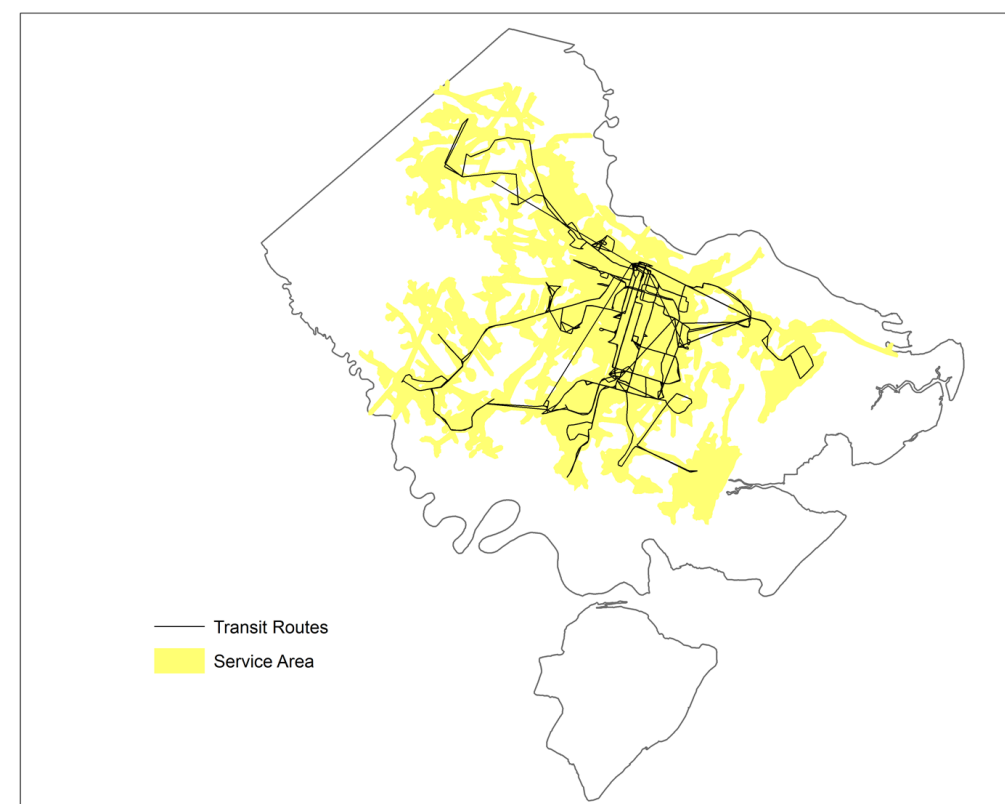
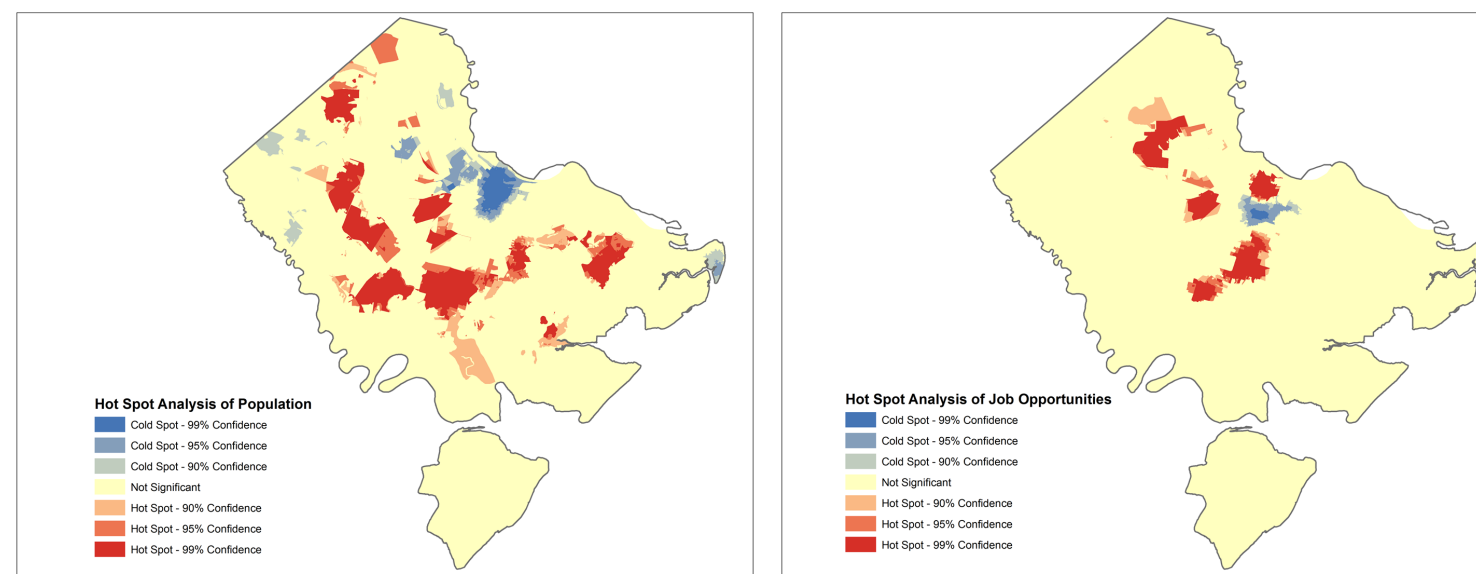
Total number of job opportunities that can be accessed within 30 minutes through transit is  
**1,157,067.**

And the average job opportunities in each census block is **50.**

### Chatham County

Chatham Area Transit (CAT)

The hot spot analysis suggests most of the County's population tend to live near the urban core of Savannah, also, quite a few people choose to live in communities near Whitmarsh Island. A lot of job opportunities are located in downtown Savannah and places near Savannah International Airport. But interestingly, the employment hot spot analysis also found the some cold spots in Midtown Savannah, where many green spaces are concentrated.



Average Service Area around each census block centroid  
**3.65** square miles

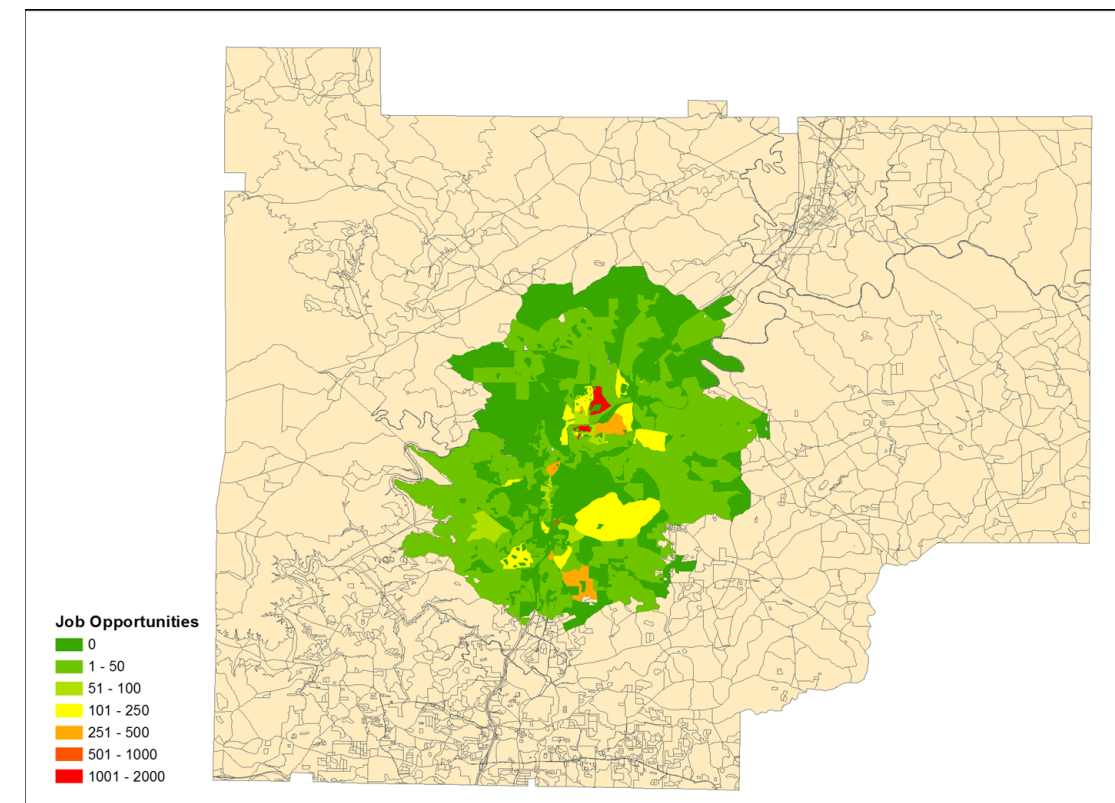
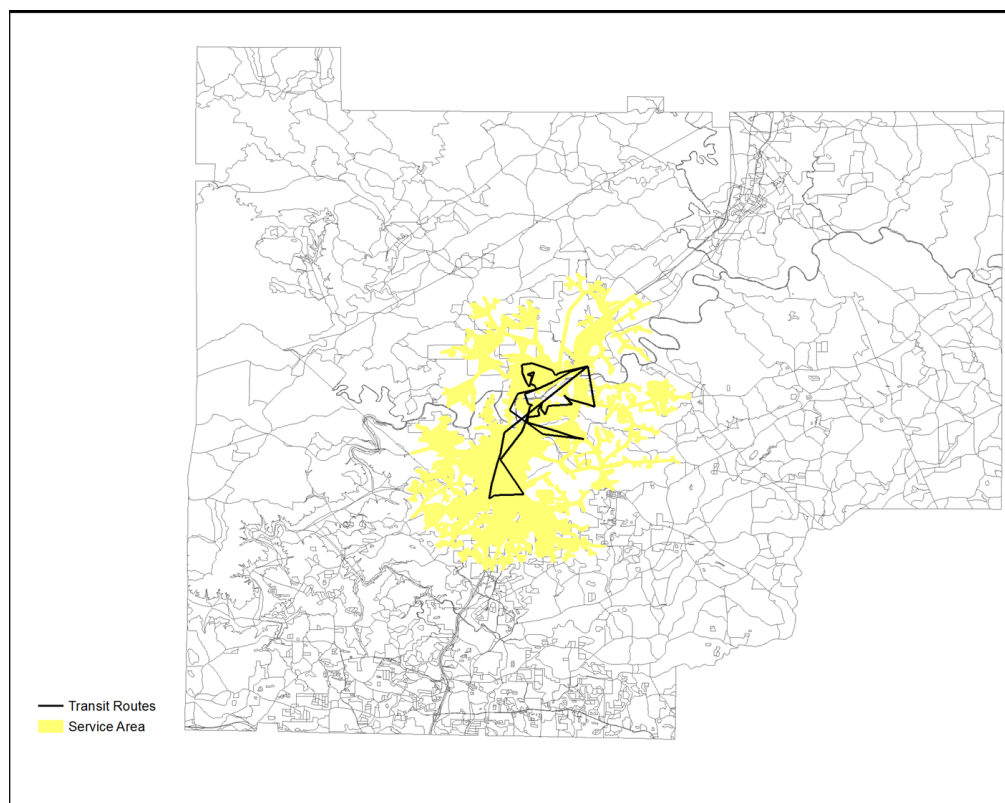
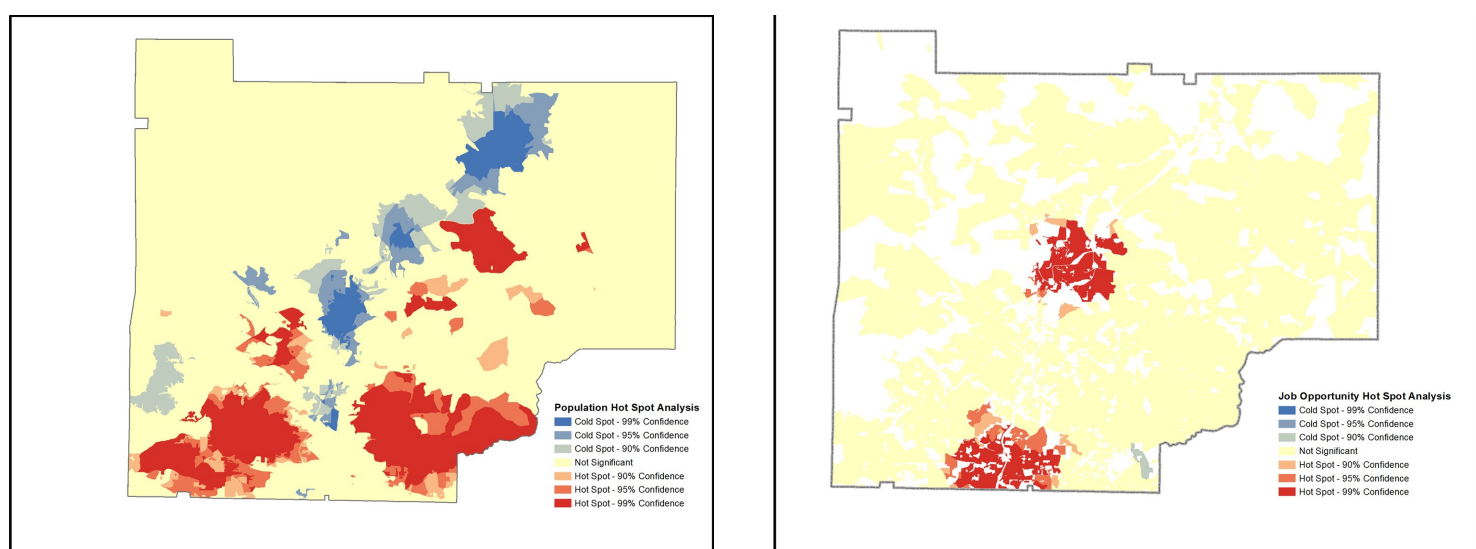
Total number of job opportunities that can be accessed within 30 minutes through transit is:  
**129,330**

And the average job opportunities in each census block is **22.**

### Cherokee County

Cherokee Area Transportation System (CATS)

Most people live in the suburb areas near Woodstock, and another population cluster can be found in the suburban areas near Canton city. In Cherokee County, most job opportunities are available in three urban areas: Canton, Holly Spring and Woodstock.



Average Service Area around each census block centroid  
**2.24** square miles.

Total number of job opportunities that can be accessed within 30 minutes through transit is:  
**12,952**

And the average job opportunities in each census block is **13.**